

Hybrid Simulations of Acceleration of Pick-Up Ions at the Heliospheric Termination Shock*

P C Liewer, S Rath, B Goldstein (Jet Propulsion Laboratory, California institute of Technology, Pasadena CA 91109; 81 8-354-6538)

N Omid (Dept. Electrical and Computer Engineering and California Space institute, UCSD, La Jolla, CA 92093)

Anomalous cosmic rays may result from the acceleration of pick-up ions at the solar wind termination shock. Here we present results of one-dimensional hybrid simulations of pick-up ion acceleration at the solar wind termination shock, where both solar wind and pick-up ions are treated self-consistently. In the simulations of oblique shocks, reflected pick-up ions excite large amplitude upstream magnetosonic waves [1]. The pick-up ions scatter between the upstream fluctuations and the shock and are accelerated via both diffusive and shock drift acceleration. The efficiency of shock acceleration will be studied for various upstream pick-up ion densities, shock angles and Mach numbers. The observed energetic particle fluxes will be compared with the predictions of standard cosmic ray transport theory. The computations are performed on the Intel Delta Touchstone parallel supercomputer.

1 P C Liewer, B E Goldstein, and N Omid, "Hybrid simulations of the effects of pick-up ions on the solar wind termination shock," (to be published, JGR, 1993)

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2. 011216771 (P. Liewer)

3. (a) P. C. Liewer
MS 169-506
JPL
4800 Oak Grove Dr.
Pasadena, CA 91109

(b) tel: 818-354-6538

(c) fax: 818-354-8895

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